❑ MN1880024 / 4824 / 3224 / 2424

Type			**MN1880024 / 4824 / 3224 / 2424**
ROM (x8-bit)			External / 48K / 32K / 24K
RAM (x8-bit)			704 / 928 / 928
Minimum Instruction Execution Time	With Main Clock operated		**0.200µs (at 4.5 to 5.5V, 20MHz)** **0.400µs (at 3.0 to 5.5V, 10MHz) : MN1884824 only**
	With Sub-clock operated		**122µs (at 2.7 to 4.0V, 32.768kHz)**
Interrupts			• RESET • External 0 / Key Input • External 1 • External 2 / External 3 / External 4 / External 5 • Timer 0 • Timer 1 / PWM • Timer 2 • Timer 3 / A/D • Timer 4 • Serial 0 • Serial 1 / UART • Runaway
Timer Counter			**Timer Counter 0 : 16-bit x 1** (Synchronous Output [4-bit x 1ch]) Clock Source .....1/2 of System Clock, 1/16 of OSC Oscillation Clock Interrupt Source .....Overflow of Timer Counter 0, Coincidence of Output Compare Register 0 and Timer Counter 0 **Timer Counter 1 : 16-bit x 1** (Timer Output, Event Count) Clock Source .....1/2 of System Clock, 1/16 of OSC Oscillation Clock, External Clock Interrupt Source .....Overflow of Timer Counter 1 **Timer Counter 2 : 16-bit x 1** (Input Capture, PWM Output) Clock Source .....1/2 of System Clock, 1/16, 1/24 of OSC Oscillation Clock Interrupt Source .....Overflow of Timer Counter 2, Specified Edge of TCIO2 **Timer Counter 3 : 16-bit x 1** (Generation of A/D converter trigger, Serial Index Search) Clock Source .....1/2 of System Clock, 1/16 of OSC Oscillation Clock Interrupt Source .....Overflow of Timer Counter 3 **Timer Counter 4 : 16-bit x 1** (Event Count, Synchronous Serial Clock Generator) Clock Source .....1/16 of OSC Oscillation , External Clock Input Interrupt Source .....Overflow of Timer Counter 4 (Switch to Timer Counter 5) **Timer Counter 5 : 16-bit x 1** (Watchdog, Time Base, Clock function) Clock Source .....1/4 of OSC Oscillation Clock, XI Oscillation Clock Interrupt Source .....1/2048, 1/4096, 1/8192 of Timer Counter 5 (Switch to Timer Counter 4)
Serial Interface			**Serial : 8-bit x 2** (Synchronous Type) (Transfer direction of MSB/LSB selectable, Start Condition function, Serial transfer Index Search) Clock Source .....1/4, 1/16, 1/32 of System Clock, External Clock, 1/2 of Timer Counter 4 **UART x 1** (8-bit Baud Rate Timer built-in)
I/O Pins	**I/O**	**58**	• Common use : 27 • Input/Output selectable (P0, P1, P4 to 6, P9 : by-bit, P3, P7 : by-byte)
	Input	**15**	• Common use : 15 • A/D Input selectable (P8 : by-bit)
A/D Inputs			8-bit x 8ch (without S/H)
PWM			16-bit x 1ch (at Repetition Cycle 0.80µs to 26.2ms, 20MHz), 10-bit x 1ch (at Repetition Cycle 0.4 to 204.8µs, 20MHz)
ICR			16-bit x 1ch
OCR			16-bit x 1ch

Special Ports

Synchronous Output (4-bit x 1ch)

Expanded Memory Access Mode

High-speed bus mode/standard bus mode function

* A memory-wait addition function is available during the high-speed mode on the MN1884824 / 3224 / 2424 MN18P86424 only.

Package

MN1880024 / 4824 / 3224 / 2424: QFP084-P-1818E
MN1880024 / 4824: QFH084-P-1212

Electrical Characteristics

Supply Current

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating Supply Current	IDD1	At 20MHz Opeation			70	mA
	IDD2	At 32kHz Operation			5	mA
Supply Current at STOP	IDD3	Oscillation halt			50	µA
Supply Current at HALT	IDD4	20MHz Oscillaiton halt			500	µA

(Ta= –20 to +70°C, VDD=5.0V, VSS=0V)

A/D Converter Characteristics

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
A/D Conversion Linearity Error					±2	LSB
Zero Transition Voltage	VOT				500	mV
Full-scale Transition Voltage	VFT		4500			mV
A/D Conversion Time		fosc=20MHz, at High Speed A/D Conversion			2.60	µs
Analog Input Voltage	VIA		Vref–		Vref+	V

(Ta=25°C, VDD=5.0V, VSS=0V)

Support Tool

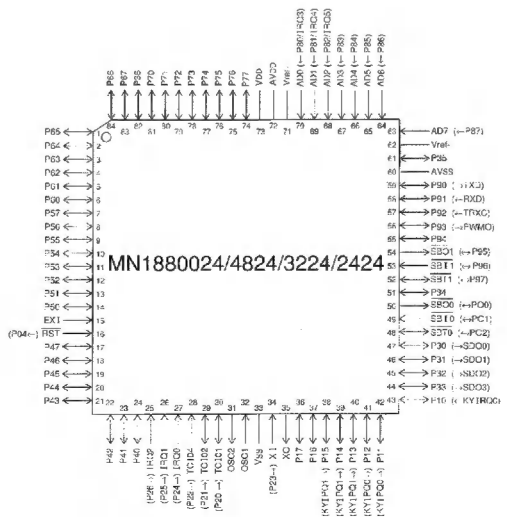
In-Circuit Emulator

Mr. ICE / 1880 (made by Computex Co. Ltd.) For 18mm x 18mm package only
PX-ICE1880-2

EPROM built-in Type

Use **MN18P86424**

Pin Assignment



QFP084-P-1818E (MN1880024 / 4824 / 3224 / 2424)
QFH084-P-1212 (MN1880024/4824)